CLAIMS

- (Previously Presented) A field grading material comprising:

 a polymer matrix, said polymer matrix having one or more polymer phases; and
 a field grading effective amount of a nanoparticle filler, said filler is: heterogeneously

 distributed in said polymer matrix such that said nanoparticle filler is well dispersed in at least part of one of said polymer phases; and said filler comprises less than 40% by volume of said field
- 2. (Previously Presented) A field grading material according to claim 1, wherein said nanoparticle filler is selected from semiconducting materials having an energy bandgap ranging from 0 eV to 5 eV and dielectric materials having a bulk dielectric constant at infinitely high frequencies of at least 5.

grading material.

- 3. (**Previously Presented**) A field grading material according to claim 1, wherein said nanoparticle filler comprises a semiconducting material.
- 4. (**Previously Presented**) A field grading material according to claim 1, wherein said nanoparticle filler is selected from ZnO, SnO, InO, CeO, TiO₂, SiC, BaTiO₃, Al₂O₃, SiO₂ and mixtures thereof.
- 5. (**Previously Presented**) A field grading material according to claim 1, wherein said polymeric matrix comprises a rubber, a thermoplastic polymer, a thermosetting polymer, or thermoplastic elastomer.
- 6. (**Previously Presented**) A field grading material according to claim 5, wherein said polymeric matrix comprises at least one of a polyolefin rubber, a thermoplastic polyolefin elastomer, a silicone rubber, and a crystalline thermoplastic polymer.
- 7. **(Previously Presented)** A field grading material according to claim 5, wherein said polymeric matrix comprises a polymer selected from EPDM and polyethylene.

- 8. **(Previously Presented)** A field grading material according to claim 1, wherein said polymeric matrix comprises a polymer blend of immiscible polymers.
- 9. (**Previously Presented**) A field grading material according to claim 8, wherein said polymer blend is selected from polyethylene/EPDM, LDPE/HDPE, and maleic anhydride-modified EPDM/EPDM.
- 10. (**Previously Presented**) A field grading material according to claim 1, wherein said nanoparticles have a particle size in at least one of a range from 2 to 80 nm, from 5 to 50 nm, and from 5 to 30 nm.
- 11. (**Previously Presented**) A field grading material according to claim 1, wherein said nanoparticle filler comprises less than 40% by volume of the field grading material, less than 30% by volume of the field grading material, or less than 20% by volume of the field grading material.
- 12. (**Previously Presented**) A field grading material according to claim 1, wherein a surface of said nanoparticle filler is modified by treatment with a organosilane or organotitanate compound and the organosilane compound comprises an organic group selected from alkyl, alkylamino, amino and carboxy.
- 13. (**Previously Presented**) A field grading material according to claim 12, wherein said organic group is selected from methyl, decyl, octyl, vinyl, aminopropyl and acetoxy.
- 14. (**Previously Presented**) A field grading material comprising a nanoparticle filler distributed in a polymeric matrix, wherein a surface of said nanoparticle filler is modified by treatment with an organosilane or organotitanate compound and said organosilane compound comprises an organic group selected from alkyl, alkylamino, amino and carboxy.
- 15. (**Previously Presented**) A field grading material according to claim 14, wherein said organic group is selected from methyl, decyl, octyl, vinyl, aminopropyl, and acetoxy.
- 16. (Previously Presented) A field grading material comprising a carbon nanotube filler

distributed in a polymeric matrix, wherein said filler is heterogeneously distributed in said polymeric matrix and said polymeric matrix comprises a rubber, a thermoplastic polymer, a thermoplastic polymer, thermoplastic elastomer, or a crystalline thermoplastic polymer.

- 17. (**Previously Presented**) A field grading material according to claim 16, wherein said polymeric matrix comprises a polymer selected from EPDM and polyethylene.
- 18. (**Previously Presented**) A method for reducing electric field stress at a joint or termination of an electric cable, said method comprising introducing in said joint or termination a field grading material according to claim 1.
- 19. (**Previously Presented**) An insulating material comprising an insulating effective amount of a nanoparticle filler distributed in a polymeric matrix, wherein said nanoparticle filler is heterogeneously distributed in said polymeric matrix.
- 20. (**Previously Presented**) An insulating material according to claim 19, wherein said nanoparticle filler is selected from semiconducting materials having an energy bandgap ranging from 0 eV to 5 eV and dielectric materials having a bulk dielectric constant at infinitely high frequencies of at least 5.
- 21. (**Previously Presented**) An insulating material according to claim 19, wherein said nanoparticle filler comprises a semiconducting material.
- 21. (**Previously Presented**) An insulating material according to claim 19, wherein said nanoparticle filler is selected from ZnO, SnO, InO, CeO, TiO₂, SiC. BaTiO₃, Al₂O₃, SiO₂ and mixtures thereof.
- 23. (**Previously Presented**) An insulating material according to claim 19, wherein said polymeric matrix comprises a rubber, a thermoplastic polymer, a thermosetting polymer, or thermoplastic elastomer.
- 24. (Previously Presented) An insulating material according to claim 23, wherein said

polymeric matrix comprises at least one of a polyolefin rubber, a thermoplastic polyolefin elastomer, a silicone rubber, and a crystalline thermoplastic polymer.

- 25. (**Previously Presented**) An insulating material according to claim 23, wherein said polymeric matrix comprises a polymer selected from EPDM and polyethylene.
- 26. (**Previously Presented**) An insulating material according to claim 19, wherein said polymeric matrix comprises a polymer blend of immiscible polymers.
- 27. (**Previously Presented**) An insulating material according to claim 26, wherein said polymer blend is selected from polyethylene/EPDM, LDPE/HDPE, and maleic anhydride-modified EPDM/EPDM.
- 28. (**Previously Presented**) An insulating material according to claim 19, wherein said nanoparticles have a particle size in at least one of a range from 2 to 80 nm, from 5 to 50 nm, and from 5 to 30 nm.
- 29. (**Previously Presented**) An insulating material according to claim 19, wherein said nanoparticle filler comprises less than 20% by volume of the insulating material, less than 10% by volume of the insulating material, or less than 5% by volume of the insulating material.
- 30. (**Previously Presented**) An insulating material according to claim 19, wherein a surface of said nanoparticle filler is modified by treatment with an organosilane or organotitanate compound and said organosilane compound comprises an organic group selected from alkyl, alkylamino, amino and carboxy.
- 31. **(Previously Presented)** An insulating material according to claim 30, wherein said organic group is selected from methyl, decyl, octyl, vinyl, aminopropyl and acetoxy.
- 32. (**Previously Presented**) An insulating material comprising a nanoparticle filler distributed in a polymeric matrix, wherein a surface of said nanoparticle filler is modified by treatment with an organosilane or organotitanate compound and said organosilane compound comprises an organic Page 5 of 8

group selected from alkyl, alkylamino, amino and carboxy.

- 33. (**Original**) An insulating material according to claim 32, wherein the organic group is selected from methyl, decyl, octyl, vinyl, aminopropyl and acetoxy.
- 34. (**Previously Presented**) An insulating material comprising a carbon nanotube filler distributed in a polymeric matrix, wherein said filler is heterogeneously distributed in said polymeric matrix and said polymeric matrix comprises a rubber, a thermoplastic polymer, a thermosetting polymer, thermoplastic elastomer or a crystalline thermoplastic polymer.
- 35. (**Previously Presented**) An insulating material according to claim 34 wherein a polymeric matrix comprises a polymer selected from EPDM and polyethylene.
- 36. (**Previously Presented**) A process for manufacturing a field grading material, said process comprising:

mixing a nanoparticle filler with at least one polymer to form a mixture, wherein said polymer is in a particulate form, said polymer particulates being at least 10 times greater in size than said nanoparticle filler, and said polymer comprises a rubber, a thermoplastic polymer, a thermosetting polymer, or a thermoplastic elastomer; and

heating said mixture to form said field grading material.

- 37. (**Previously Presented**) A process according to claim 36, wherein said at least one polymer comprises a mixture of immiscible polymers.
- 38. **(Previously Presented)** A process according to claim 36, wherein said polymer is selected from a group consisting of polyolefin rubber, a thermoplastic polyolefin elastomer, a silicon rubber, and a crystalline thermoplastic polymer.
- 39. (**Previously Presented**) A process according to claim 36, wherein said polymer is selected from EPDM and polyethylene.

- 40. **(Previously Presented)** A process according to claim 36, wherein said polymer particulates are at least 100 times greater in size than the nanoparticle filler.
- 41. **(Previously Presented)** A process according to claim 36, wherein said polymer particulates are at least 1000 time greater in size than the nanoparticle filler.
- 42. **(Previously Presented)** A process according to claim 36, wherein said nanoparticle filler is semiconducting carbon nanotubes.